

**REMARKS**

This amendment is filed after final rejection. The rejected claims are 1-7, 9-11, 13-17, and 19-26. After reviewing the rejections under 35 U.S.C. §112, first paragraph, Applicant noticed that the pages in the provisional application Serial No. 60/198,927, to which this application claims priority, are numbered differently than the pages in the electronic copy in Applicant's files. Applicant's representative brought this to the attention to Examiner Michalski, who agreed that the page cited as "page 101" in the previous response as support for the feature "isolating a portion of the response signal" recited in amended claim 1 can indeed be found on page 91 in the provisional application. A copy of page 101 in Applicant's copy (which corresponds essentially to page 91 of the filed provisional application) is enclosed with this submission.

Support for using only the anechoic portion of the impulse response for determining the filter coefficient can also be found on the first line on page 91 of the provisional application. This section refers back to section 3.4 on page 32/33, where a rationale is given for this selection. Simply stated, if the system is not minimum phase (i.e., if more reflections are included), the equations cannot be inverted to create the filter coefficients, and the system becomes unstable.

Applicant thanks the Examiner for pointing to an error in the claim language of claims 1, 4 and 19, which has been addressed by amending the claims. For example, claim now recites the steps of "correlating the electric response signal with the MLS signal to determine an impulse response, determining from the impulse response an anechoic portion of the impulse response between a time of flight signal and a first reflected signal, using the anechoic portion of the impulse response to compute filter coefficients." The amended claims 1, 4, and 19 now agree with page 10 of the specification.

In view of the clarification amendments to claims 1, 4, and 19, withdrawal of the rejection of claims 1-7, 9, and 19-26 under 35 U.S.C. §112, first paragraph, is respectfully requested.

Rejection under 35 U.S.C. §103(a)

The rejection of claims 10, 11, and 13-17 under 35 U.S.C. §103(a) as being unpatentable over Eatwell et al. (U.S. Patent No. 5,481,615) in view of Zacharov et al. (U.S. Patent No. 6,639,989) is hereby traversed and reconsideration thereof is respectfully requested in view of remarks set forth below.

The Office Action mailed 7/9/2004 (Paper #7) indicated that claim 8 was allowable over the art of record, which included the Eatwell and Zacharov patents. The Examiner did not at that time raise the question of adequacy of written description, and claim 8 being part of the application as originally filed is considered as satisfying the written description requirement under 35 U.S.C. §112, first paragraph (see MPEP 2163.04). Moreover, the specification states with particularity on page 7, lines 3-4: "Optimization of the 'closeness of fit' may include adjusting the length of the MLS signal." In the response to this Office Action dated 9/30/2004, Applicant amended claim 10 to incorporate the subject matter from allowable claim 8.

Eatwell, col. 4, lines 47-48, mentions adjusting "the filter characteristic," but does not teach or suggest the use of multiple different MLS signals and/or adjusting the length of an MLS signal, as claimed. This feature is also not taught by Zacharov. Applicant therefore submits that claim 10 is allowable over the art of record. Withdrawal of the rejection of claim 10 over Eatwell and Zacharov and allowance of claims 10, 11, and 13-17 is therefore respectfully requested.

Newly added claims further clarify the role of the anechoic response. No new matter has been introduced by the present amendment. Applicant submits that all claims are now in condition of allowance, which action is respectfully requested.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-1945, under Order No. KHEN-P01-001 from which the undersigned is authorized to draw.

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Respectfully submitted,

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## CHAPTER 6. EXPERIMENTAL RESULTS

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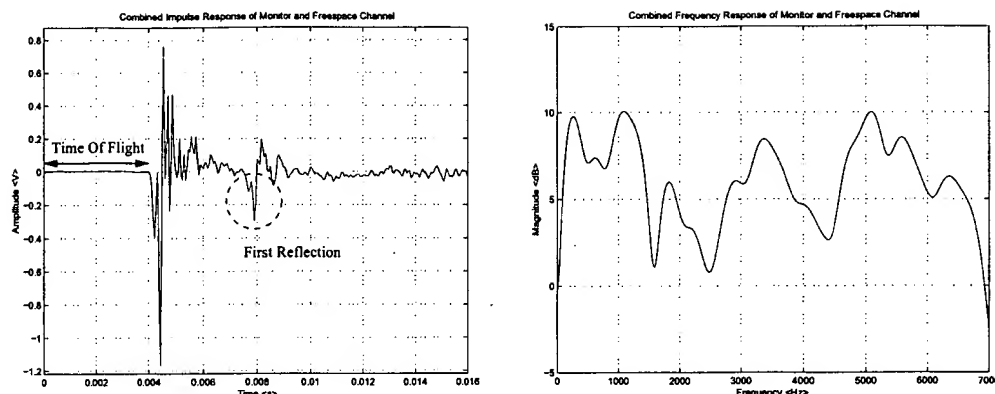


Figure 6.12: Combined impulse and frequency response of RADIANT monitor and freespace channel.

be impossible since the speed of sound is finite) nor is it to try and compensate for room reflections. Only a selective region of the impulse response is modeled. Selecting the region after the TOF and before the first reflection will isolate the portion of the response known as the anechoic response, which is the direct path between the monitor and the microphone. Recall from section 3.4 that a minimum phase system has most of its energy around the beginning of the impulse response; therefore, the more reflections that are included in the region of interest, the more the system becomes less minimum phase, and the greater the error term  $\Upsilon$  becomes.

### 6.5.2 Matched Filter for Freespace / Whitened Response

The same process is followed here to generate the matched filter coefficients as in the previous sections. Figure 6.13 shows the original frequency response magnitude overlaid with simulated whitened responses using filter orders of  $M = [5, 10, 15, 50, 100]$ . A plot of the LMS error is also included, which shows the points that correspond to the simulated filter lengths used. Comparing actual whitening results with the simulated ones (see figure 6.13), is limited to the case of filter orders of  $M = [5, 10]$ . Again, this limitation is a result of exceeding the dynamic range of the CODEC, the additional power-amplifier in the measurement path